# Agilent N5980A
# 3.125 Gb/s Serial BERT

Data Sheet

Version 1.0

## Key Benefits

- **Standard measurement rates between 125 Mb/s and 3.125 Gb/s**
- **Electrical and optical (SFP) interfaces (generator: concurrently)**
- **PRBS, K28.5 pattern or clock generation and integrated clock data recovery**
- **Smallest BERT available today**
- **Easy-to-use and cost efficient**
- **Controlled from user software running on an external Windows 2000 or XP PC connected by a USB 2.0 interface**
- **BERT can be fully programmed**

The Agilent N5980A 3.125 Gb/s Serial BERT is ideal for manual or automated manufacturing test of electrical and optical devices running at speeds between 125 Mb/s to 3.125 Gb/s. It addresses all common standard speeds via selectable bit rates.

**Easy-to-use and cost efficient**
The software user interface has one standard or one advanced screen to ensure intuitive use for operators. It makes the instrument easy to use and easy to learn.

**Twice the measurement throughput**
By using both the electrical and optical (SFP) interfaces concurrently, you can double your measurement throughput (electrical in/optical out and vice versa).

**Automation made easy**
The remote programmability of the user interface, using SCPI-syntax, makes it simple to integrate the N5980A into other programs.

**PRBS, K28.5 pattern or clock generation and integrated clock data recovery**
The N5980A can generate standard PRBS polynomials, K28.5 ('Comma') characters and different sub-rate clocks (/2 to /20). It can also inject errors with an adjustable error ratio. The receiver has a clock-data-recovery (CDR) built-in and differential inputs (SMA) for signals from 50 $mV_{pp}$ to 2 $V_{pp}$ amplitude.

**Standard (SFP) optical module plug-in**
The instrument has a standard SFP-female connector. This enables all different kind of user-selectable optical modules (e.g for multi-mode/single-mode fiber at 850nm, 1310nm and 1550nm for the test set-up).

**Small size**
Its very small size allows the N5980A to fit on any bench and in any automated setup. The dimensions are, WxHxD, 228mm x 59mm x 246mm (Bench top dimensions.)

## System Specifications

### Data rate

The same data rate applies for pattern generator electrical out and optical out, and for error detector electrical in and optical in.

| Data rates | |
|---|---|
| Fast Ethernet | 125 Mb/s |
| OC-3 | 155.52 Mb/s |
| OC-12 | 622.08 Mb/s |
| OC-48 | 2.48832 Gb/s |
| OC-48 with FEC | 2.66606 Gb/s |
| 1 x FC | 1.0625 Gb/s |
| 2 x FC | 2.125 Gb/s |
| 1 x Gigabit Ethernet | 1.25 Gb/s |
| XAUI | 3.125 Gb/s |
| Accuracy | ± 50 ppm |

### Operating system

The software supplied runs on Windows 2000 or XP with .NET v2.0, by a USB 2.0 interface.

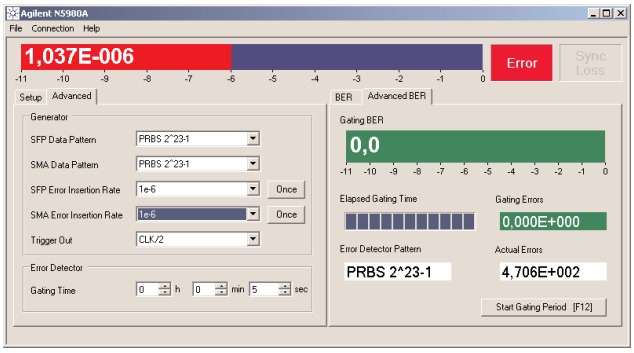


Figure 1: User interface-advanced mode

## Pattern Generator

### Pattern

The following patterns are supported:
PRBS: $2^7$-1, $2^{15}$-1, $2^{23}$-1, $2^{31}$-1.
Data pattern: K28.5.
Clock pattern: data rate divide by n, n=2,4,8,10,16,20

The pattern can be **individually** adjusted for pattern generator electrical out and optical out.

### Error injection

Fixed electrical and optical error inject: Fixed error ratios of 1 error in $10^n$ bits, n=3,4,5,6,7,8,9.
Single error injection. Separate error ratios can be adjusted for pattern generator electrical out and optical out.

### Pattern generator electrical out

A differential electrical output is provided on the front-panel.

| Out/$\overline{\text{Out}}$ | |
|---|---|
| Output type | differential, AC-coupled, external 100 Ω differential termination |
| Amplitude, selectable | |
| ECL: | 850 $mV_{pp}$ typ., single-ended<br>1700 $mV_{pp}$ typ., differential |
| LVDS: | 400 $mV_{pp}$ typ., single-ended<br>800 $mV_{pp}$ typ., differential |
| Jitter peak-peak | 0.05 UI typ. @ OC-12<br>0.08 UI typ. @ GbE<br>0.15 UI typ. @ OC-48 |
| Connector | SMA, front panel |

### Pattern generator optical out

A standard SFP housing is provided. Minimum number of insertion/deinsertion cycles: 200.

### Trigger output

A single-ended, electrical output is provided on the front-panel.

| Trigger out | |
|---|---|
| Output type | single-ended |
| Impedance | 50 Ω nominal, AC-coupled |
| Amplitude | 850 mV typ. |
| Clock rate, selectable data rate | divided by n, n=2,4,8,10,16,20 |
| Connector | SMA, front Panel |

## Error Detector

A differential electrical input is provided on the front-panel. Data rate is the same as pattern generator.

### Pattern

The following patterns are supported:
PRBS: $2^7$-1, $2^{15}$-1, $2^{23}$-1, $2^{31}$-1.

| In/$\overline{\text{In}}$ | |
|---|---|
| Input type | differential, AC-coupled |
| Max. input amplitude | 1 $V_{pp}$, single-ended<br>2 $V_{pp}$, differential |
| Impedance | 100 Ω nominal |
| Sensitivity | < 50 mV |
| Clocking mode | internal CDR |
| Synchronization | automatically on level, polarity, phase, bit and pattern |
| Connector | SMA, front panel |

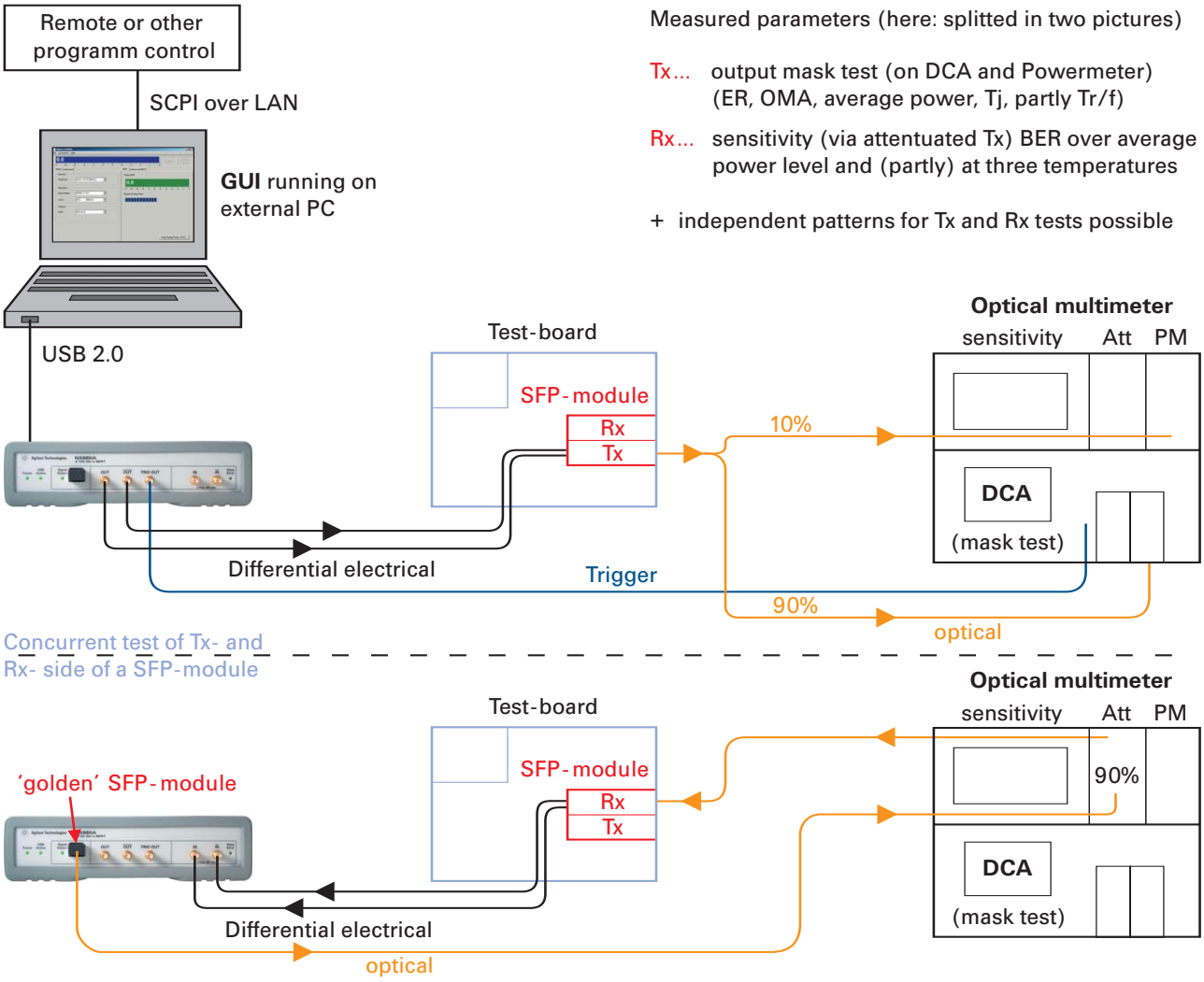


Figure 2: Typical manufacturing tests of SFP-modules

## General

| General | |
|---|---|
| Power supply | 100 V to 240 V ~, 50-60 Hz |
| Power consumption | 50 VA max |
| Operating temperature | 0 °C to 55 °C |
| Operating altitude | up to 2000 m |
| Storage temperature | -30 °C to 70 °C |
| Interface | USB 2.0 standard |
| Language | SCPI syntax |
| Dimensions (W x H x D) | |
| Bench top (with bumper) | 228 x 59 x 246 mm |
| Rack mount (without bumper) | 1/2* 19" width, 1 U height (213 x 44.5 x 245 mm) |
| Weight | 1660 g |
| Safety designed to | IEC61010-1 |
| EMC tested to | IEC61326 |
| Warm-up time | 10 min |
| Warranty | 1 year standard |

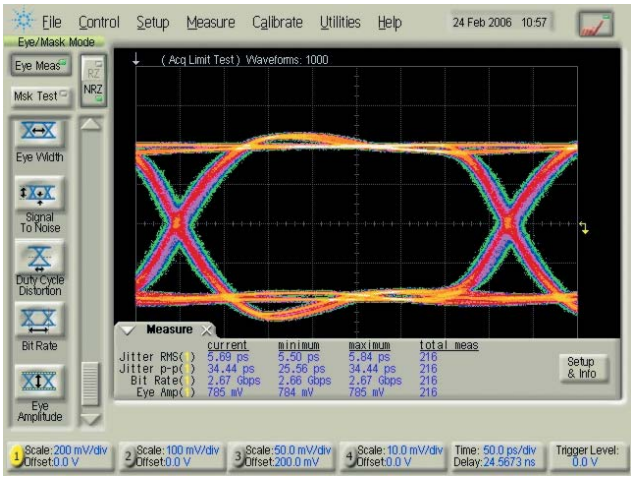


Figure 3: Typical eye diagram at 2.66 Gb/s

## Ordering Information

**Accessories Included**
User Software and Demo CD includes:
- Application Presentation
- Data Sheet
- User documentation (User Guide with programming reference)
- User Software including offline demonstration

Local power cord, USB cable, SFP loopback connector

| Related Literature | Publication Number |
|---|---|
| J-BERT N4903A High-Performance Serial BERT Brochure | **5989-3882EN** |
| J-BERT N4903A High-Performance Serial BERT Data Sheet | **5989-2899EN** |
| N4906B Serial BERT 12.5 Gb/s Data Sheet | **5989-2406EN** |
| Physical Layer Test Brochure | **5988-9514EN** |
| ParBERT 81250 Product Overview | **5968-9188E** |
| Infiniium DCA-J Wide-Bandwidth Oscilloscope Data Sheet | **5989-0278EN** |
| Infiniium 80000 Series Data Sheet | **5989-1487ENUS** |
| Fast Total Jitter Test Solution Application Note | **5989-3151EN** |

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